WHAT IS CLAIMED IS:

1. A medical implant for placement into a specific implant region within a biological organism comprising an implant body at least partial constructed of a bulk-solidifying amorphous alloy having an elastic strain limit of around 1.2% or more, wherein the implant body has a plurality of surface feature on an outer surface thereof having an average roughness and an average particle size such that the outer surface of the implant body has biological, mechanical and morphological compatibility with the implant region.

2. The medical implant as described in claim 1, wherein the outer surface of the implant body has a plurality of pores with diameters between about 10 to 500 μm.

3. The medical implant as described in claim 1, wherein the outer surface of the implant body has a plurality of pores with diameters between about 100 to 500 μm.

4. The medical implant as described in claim 1, wherein the outer surface of the implant body has a plurality of pores with diameters between about 100 to 200 μm.

5. The medical implant as described in claim 1, wherein the outer surface of the implant body has an average roughness of between 1 to 50 μm.

6. The medical implant as described in claim 1, wherein the outer surface of the implant body has a surface texture selected from the group consisting of concave, convex, and mixture of concave and convex.

7. The medical implant as described in claim 1, wherein the bulk-solidifying amorphous alloy is described by the following molecular formula: $(Zr,Ti)_a(Ni,Cu,Fe)_b(Be,Al,Si,B)_c$, wherein "a" is in the range of from about 30 to 75, "b" is in the range of from about 5 to 60, and "c" in the range of from about 0 to 50 in atomic percentages.

8. The medical implant as described in claim 1, wherein the bulk-solidifying amorphous alloy is described substantially by the following molecular formula: $(Zr)_a(Nb,Ti)_b(Ni,Cu)_c(Al)_d$, where a is in the range of from 45 to 65, b is in the range of from

0 to 10, c is in the range of from 20 to 40, and d in the range of from 7.5 to 15 in atomic percentages.

9. A medical implant as described in claim 1, wherein the bulk-solidifying amorphous alloy has an elastic strain limit of around 1.8% or more.

10. The medical implant as described in claim 1, wherein the bulk-solidifying amorphous alloy has a high fracture toughness of at least about 10 ksi-√in.

11. The medical implant as described in claim 1, wherein the bulk-solidifying amorphous alloy has a high hardness value of at least about 5.0 GPa.

12. The medical implant as described in claim 1, wherein the bulk-solidifying amorphous alloy is based on ferrous metals.

13. The medical implant as described in claim 1, wherein the bulk-solidifying amorphous alloy is a Zr/Ti-base alloy and further comprises a ductile metallic crystalline phase precipitate.

14. The medical implant as described in claim 1, wherein the bulk-solidifying amorphous alloy is Al free.

15. The medical implant as described in claim 1, wherein the bulk-solidifying amorphous alloy is Ni free.

16. The medical implant as described in claim 1, wherein the bulk-solidifying amorphous alloy is Be free.

17. The medical implant as described in claim 1, wherein at least a portion of the implant body is constructed of a conventional implantation material.

18. The medical implant as described in claim 1, wherein at least a portion of the implant body is coated with a biocompatible resin cement.

19. The medical implant as described in claim 1, wherein the portion of the implant body formed from the bulk-solidifying amorphous alloy has a section thickness of at least 0.5 mm.

20. The medical implant as described in claim 1, wherein the implant body is in the form of a load bearing member.

21. The medical implant as described in claim 1, wherein the implant body is in the form of an articulating joint.

22. The medical implant as described in claim 1, wherein the bulk-solidifying amorphous alloy has a supercooled liquid region of more than 90 °C.

23. A method of manufacturing a medical implant for placement into a specified implant region of a biological organism comprising:

providing a feedstock of a bulk-solidifying amorphous alloy;

heating the feedstock to at least above the glass transition temperature of the bulk solidifying amorphous alloy to form a moldable alloy;

shaping the moldable alloy to form an implant body having a plurality of surface features on an outer surface thereof having an average roughness and an average particle size such that the outer surface of the implant body has biological, mechanical and morphological compatibility with the implant region; and

quenching the medical implant at a cooling rate sufficient to ensure that the bulk solidifying amorphous alloy has a substantially amorphous atomic structure having an elastic strain limit of around 1.2% or more.

24. The method as described in claim 23, wherein the step of shaping includes feeding the moldable alloy into a mold having a negative impression of the desired implant body surface features.

25. The method as described in claim 24, wherein the mold is a permanent mold.

26. The method as described in claim 23, wherein the step of heating includes heating the feedstock to at least above the melt temperature of the bulk solidifying amorphous alloy to form a molten alloy.

27. The method as described in claim 23, wherein the bulk-solidifying amorphous alloy has a supercooled liquid region of more than 90 °C.

28. The method as described in claim 23, further comprising surface treating the outer surface of the implant body with a treatment selected from the group consisting of a chemical treatment, a thermal treatment, and a combination of chemical and thermal treatments.

29. The method as described in claim 23, further comprising the step of coating the outer surface implant body with a biocompatible resin cement.

30. The method as described in claim 23, wherein the medical implant is shaped into a load bearing member.

31. A method of manufacturing a medical implant for placement into an specified implant region of a biological organism comprising:

providing a pre-fabricated implant body of a bulk-solidifying amorphous alloy having an outer surface;

heating the implant body to about the glass transition temperature of the bulk solidifying amorphous alloy;

pressing the heated implant body against a mold to form a plurality of surface feature on the outer surface having an average roughness and an average particle size such that the outer surface of the implant body has biological, mechanical and morphological compatibility with the implant region; and

quenching the medical implant at a cooling rate sufficient to ensure that the bulk solidifying amorphous alloy has a substantially amorphous atomic structure having an elastic strain limit of around 1.2% or more.

32. The method as described in claim 31, wherein the mold is a permanent mold.

33. The method as described in claim 31, wherein the bulk-solidifying amorphous alloy has a supercooled liquid region of more than 90 °C.

34. The method as described in claim 31, further comprising surface treating the outer surface of the implant body with a treatment selected from the group consisting of a chemical treatment, a thermal treatment, and a combination of chemical and thermal treatments.

35. The method as described in claim 31, further comprising the step of coating the outer surface implant body with a biocompatible resin cement.

36. The method as described in claim 31, wherein the medical implant is a load bearing member.